

MOUNTING STRUCTURE FOR LAMP WIRES OF A BACK LIGHT MODULE

Field of the Invention

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The present invention relates to a Liquid Crystal Display (LCD), and more particularly to a mounting structure for lamp wires of a back light module in a liquid crystal display.

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Background of the Invention

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User demand for entertainment equipment is particularly high as a result of the rapid development of multimedia applications. Conventionally, the cathode ray tube (CRT) display, which is a type of monitor, is commonly used. However, the cathode ray tube display does not meet the needs of multimedia technology because of the large volume thereof. Therefore, many flat panel display techniques such as liquid crystal display (LCD), plasma display panel (PDP), and field emission display (FED) have been recently developed.

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Of these techniques, the liquid crystal display (LCD) is attracting attention in the field of displays as a full-color display. This is because of its capability for high quality display, which, unlike the CRT, is flat. On the other hand, this liquid crystal display apparatus is small in size and lightweight. Therefore, this LCD apparatus can be used in any

electrical product that requires a display to show information. For example, the LCD can be used in a calculator, an electrical dictionary, a watch, a mobile phone, a notebook, a communication terminal, a display board and so on to serve as a display to show information.

5 A conventional back light type LCD comprises a front-end liquid crystal panel and a back-end back light module. Therefore, a large back light module is required for providing enough illumination to pass through the liquid crystal layer to show the information of the LCD. Typically, fluorescent lamps are used as the back light source. The
10 light passes through a back light film to provide uniform illumination of the liquid crystal panel.

The back light film is mounted in a plastic frame for installation with other components in the back light module. A wire channel or a wire hole is built in the typical back light module for the lamp wires to
15 connect with the peripheral circuit. The lamp wires extend from the corner of the plastic frame. However, the lamp wires are either difficult to fix or easy to break because they extend from the corner in the conventional plastic frame.

20 **Summary of the Invention**

It is an object of the present invention to provide a mounting structure for mounting lamp wires in a back light module. This mounting structure can reduce bad products resulting from difficulty
25 in mounting the lamp wires.

It is another object of the present invention to provide a mounting structure for lamp wires of a back light module that provides a user-friendly mounting structure for fixing the lamp wires to increase the yield of the product.

5 Therefore, the present invention provides a mounting apparatus for lamp wires of a back light module in which at least two lamp wires extend from a plastic frame. The mounting apparatus comprises a fixed bar portion, a tabling portion, a connecting portion and a retaining clamp portion. The connecting portion connects the fixed bar portion
10 and a tabling portion to form a lamp wire channel therebetween for the first lamp wire to pass through. The connecting portion has a wire-fixing hole to fix the second lamp wire to enter the lamp wire channel. The fixed bar portion, the tabling portion and the connecting portion are mounted in a trench of the plastic frame. The tabling
15 portion and the retaining clamp portion are connected together to extend out from the plastic frame. The retaining clamp portion and the tabling portion have a wire clip hole and a clamp opening connected to the wire clip hole. The wire clip hole is perpendicularly connected to the lamp wire channel to fix the first lamp wire and the second lamp
20 wire. The clamp opening is used to mount the first lamp wire and the second lamp wire to enter the wire clip hole.

 During mounting, the second lamp wire is pressed into the wire-fixing hole to enter the lamp wire channel. Then, the whole mounting apparatus is embedded in the corresponding trench in the
25 plastic frame and the second lamp wire is fixed. Then, the second lamp

wire detours the clamp opening to fix in the wire clip hole. The first lamp wire is directly embedded into the lamp wire channel. Similarly, the first lamp wire also detours the clamp opening to fix in the wire clip hole. The above mounting method not only is easy but also can avoid
5 breaking the plastic frame during mounting.

Brief Description of the Drawings

The foregoing aspects and many of the attendant advantages of
10 this invention will become more readily appreciated as the same becomes better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a three-dimension schematic of the mounting
15 apparatus according to one preferred embodiment of the present invention;

Figure 2A is a schematic top view of the mounting apparatus according to one preferred embodiment of the present invention;

Figure 2B is a schematic side view of the mounting apparatus
20 according to one preferred embodiment of the present invention;

Figure 2C is a schematic front view of the mounting apparatus according to one preferred embodiment of the present invention; and

Figure 3 is a schematic top view of the mounting apparatus embedded in a back light module according to one preferred
25 embodiment of the present invention.

Detailed Description of the Preferred Embodiment

The back light module of the present invention is used to provide
5 the light source for the LCD panel. The fluorescent lamps and the back
light film are mounted together in the plastic frame of the back light
module. The lamp wires of the back light module are derived from the
plastic frame to connect with the peripheral power supply circuit. The
present invention provides a mounting apparatus for lamp wires of a
10 back light module to mount at least two lamp wires derived from a
plastic frame. This mounting structure can reduce the number of bad
products resulting from the difficult mounting of the lamp wires.

Figure 1 is a three-dimension schematic of the mounting
apparatus according to one preferred embodiment of the present
15 invention. Figure 2A, 2B and 2C respectively illustrate the schematic
top view, side view and front view of the mounting apparatus according
to one preferred embodiment of the present invention. Referring to
figure 1, 2A, 2B and 2C, the mounting apparatus 10 of the present
invention comprises a long shape fixed bar portion 110. A connecting
20 portion 120 extends from the middle of the fixed bar portion 110 to
connect with one end of a tabling portion 130. The fixed bar portion
110, the connecting portion 120 and the tabling portion 130 form a
“U” shape structure. The length of the fixed bar portion 110 is larger
than the length of the tabling portion 130. The fixed bar portion 110 is
25 divided into two parts, head portion and tail portion, by the connecting

portion 120. One side of the tabling portion 130 is connected to the fixed bar portion 110 and the other side is in opposite to the head portion. A lamp wire channel 124 is formed between the fixed bar portion 110 and the tabling portion 130. Those lamp wires derived from the plastic frame of the back light module are conducted to the lamp wire channel. The connecting portion 120 has an arched shape. An arched wire-fixing hole 122 is formed in the bottom of the connecting portion 120 to connect the both sides of the connecting portion 120. The wire-fixing hole 122 can fix the lamp wires passing therethrough to conduct them to the lamp wire channel 124.

The retaining clamp portion 140 is extended from the tabling portion 130. When embedding the back light module, the retaining clamp portion 140 is extended out the plastic frame 20. The retaining clamp portion 140 is like a pair of pliers in appearance. A wire clip hole 144 is formed in the middle of the retaining clamp portion 140 and the tabling portion 130. The wire clip hole 144 is perpendicular and connected to the lamp wire channel 124. The wire clip hole 144 can fix and conduct the lamp wires out from the lamp wire channel 124 to connect with the peripheral circuit. A clamp opening 142 is located in the top of the wire clip hole 144 and connects to the wire clip hole 144. The width of the clamp opening 142 is less than the diameter of the lamp wire. When mounting the lamp wires, the lamp wires can be pressed into the wire clip hole 144 to be fixed in the clamp opening 142. The size of the wire clip hole 144 is related to the required number of the lamp wires. The best size absolutely fixes the lamp wires passing

therethrough.

Figure 3 is a schematic top view of the mounting apparatus embedded in a back light module according to one preferred embodiment of the present invention. At least two lamp wires extend
5 from the plastic frame 20, including a high voltage lamp wire 314 and a low voltage lamp wire 312. The two lamp wires 312 and 314 are connected to an electrical coupling device 320 for coupling to the peripheral circuit. A sleeve is used to fix the two lamp wires 312 and 314. A trench 210 in the plastic frame 20 is used to embed the
10 mounting apparatus 10.

When mounting lamp wires, first the low voltage lamp wire 312 is pressed into the wire-fixing hole 122. Then, the mounting apparatus 10 is embedded into the trench 210 of the plastic frame 20. The low voltage lamp wire 312 can be fixed by the wire-fixing hole 122 of the
15 connecting portion 120. Before embedding the mounting apparatus 10, an adhering matter, such as a twin adhesive, can be used in the side face 114 of the tail portion of the fixed bar portion 110 to adhere the tail portion to the adjacent cover plate 230 of the plastic frame 20. Similarly, the bottom part 112 of the fixed bar portion 110 can be
20 adhered to the plastic frame 20 or the reflective cover of the lamps through an adhering matter, such as a twin adhesive. The low voltage lamp wire 312 can enter the lamp wire channel 124 through the wire-fixing hole 122. The high voltage lamp wire 314 also directly enters the lamp wire channel 124. These two lamp wires 312 and 314
25 are pressed into the wire clip hole 144 through the clamp opening. The

two lamp wires 312 and 314 can be tightly fixed in the plastic frame 20 resulting from the wire clip hole 144. This mounting method not only is easy but also can avoid the plastic frame being broken as a result of pulling and dragging the lamp wires.

5 According to above descriptions, the present invention provides a mounting structure for lamp wires of a back light module. This structure can fix the lamp wires extending from the plastic frame. Therefore, the lamp wires are orderly. Additionally, operators may easily mount these lamp wires in a back light module. Therefore, the
10 risk of the plastic frame being broken as a result of pulling and dragging the lamp wires while fixing these lamp wires is reduced.

As is understood by a person skilled in the art, the foregoing preferred embodiments of the present invention are illustrative of the present invention rather than limiting of the present invention. It is
15 intended that this description cover various modifications and similar arrangements included within the spirit and scope of the appended claims, the scope of which should be accorded the broadest interpretation so as to encompass all such modifications and similar structure.